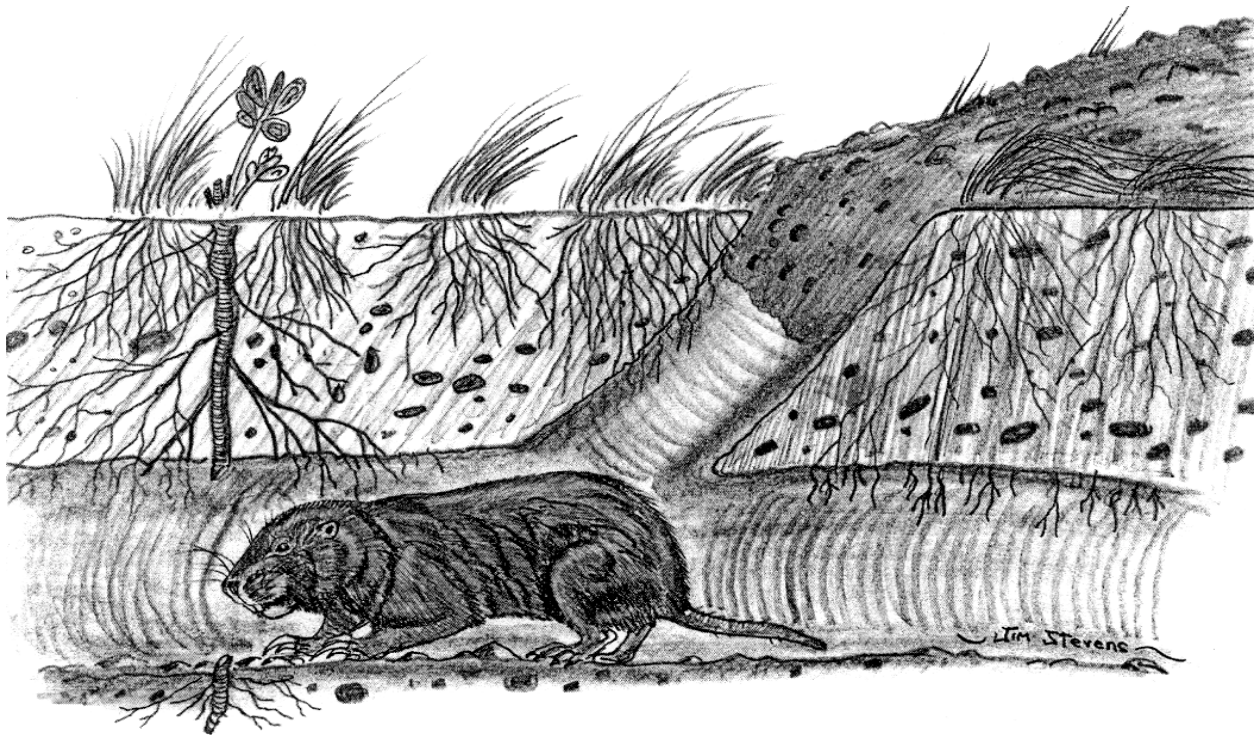


POCKET GOPHER CONTROL TECHNIQUES



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POCKET GOPHERS THEIR BIOLOGY AND CONTROL

BIOLOGY

The northern pocket gopher is one of the more damaging rodents found around the home and farm. It affects such diverse crops as alfalfa and pasture forage, Christmas tree plantations, row crops, shelter belts, and flower and vegetable gardens. The pocket gopher, a common, yet seldom seen burrowing rodent, is found throughout Montana from valley flood plains to mountain meadows.

This small animal (4 - 6 ounces) gets its name from the large, external, fur-lined cheek pouches in which it carries food. Its overall length is 6 - 9 inches including a 2 inch tail which is quite sensitive and is used as a guide when moving backward in the burrow. The forelegs are well developed with long claws used for digging and pushing soil. Pocket gophers have large front teeth used for digging and cutting food. Strong, muscular lips are able to close behind these teeth preventing soil from entering the mouth.

The pocket gopher is often mistakenly called a mole. Moles, which have similar burrowing habits, are insectivores feeding on earthworms and insect larvae and do not occur in Montana. Other animals such as the Columbian, Richardson and thirteen-lined ground squirrels are commonly called gophers. This confusion in terminology sometimes results in misidentification of a pest rodent problem and use of incorrect control methods.

Pocket gophers and ground squirrels are quite different in behavior, diets and burrow construction. Simply by observing the burrow mounds of pocket gophers and ground squirrels, the occupant can be identified. The burrow openings to ground squirrel burrows are always open. In contrast, the pocket gopher burrow opening is plugged with soil.

Gopher burrow systems are complex and may include up to 800 feet of tunnels. Main tunnels, about

3 inches in diameter, run 4 to 8 inches below the surface. Soil, excavated from the tunnel system is pushed to the surface through laterals that branch off the main tunnel. Chambers are excavated off the main tunnels for nest sites and food caches. Foraging activity occurs in the shallow burrows and these comprise the majority of the burrow systems. Deep branches of the system range from 2 to 6 feet deep. During normal feeding and burrowing activities an average pocket gopher may move between 2000 - 3000 pounds of soil each year.

Pocket gophers are solitary and territorial in nature. Except during breeding and rearing of young, gophers seem to aggressively exclude other gophers from their system. On the average a single gopher occupies an area of about 2000 square feet (0.05 acre). In ideal habitat, pocket gophers may number 30 or more per acre.

Pocket gophers are active year round and do not hibernate. Stored food caches provide food when fresh vegetation is scarce or when dry or frozen soil make foraging difficult. When snow depth is sufficient, gophers burrow beneath the snow to feed on surface vegetation. Snow tunnels are often filled with soil, forming winter soil casts rather than the mounds raised at other times of the year. These snake-like casts are often seen on the ground surface in spring after snow melt in areas occupied by gophers. Some surface foraging may occur spring through fall, but usually no more than body length from burrow openings.

Bulbs, tubers and plants with succulent tap roots such as those found in flower and vegetable gardens are readily consumed. In pasture and forage crops large rooted plants such as alfalfa and rhizomatous grasses are preferred food. Grasses or other plants with fine-branched fibrous roots may comprise no more than 10 percent of a gopher's annual diet where fleshy rooted forbs are abundant.

The breeding period is from March through June. Females have one, or occasionally, two litters of 3 - 6 young per year. The gestation period is thought to be about 20 days. Young are born sightless, hairless and weigh about 1/2 ounce. They are independent at 40 days old but do not breed until the following spring. Young disperse from their parental burrow in mid to late summer to establish their own burrows.

DAMAGE

It is generally accepted that pocket gophers can, and do, damage certain crops, croplands and tree plantations. In Montana, the crop most widely affected by gophers is alfalfa. This large rooted, succulent forb often grown in better soils provides an ideal food difficult to measure and varies greatly depending on crop growing conditions, size of the gopher population and crop value. Production loss in alfalfa from gophers sometimes goes unnoticed by growers or is thought to be minor. Because pocket gophers thin alfalfa stands rather than crop them down, damage is not easily observed. Various studies have shown gophers can reduce irrigated alfalfa production by 20 percent. Other studies of gopher damage in dryland alfalfa have shown reductions of 30 to 40 percent. The damage that is noted by haygrowers and often of more concern than forage loss is equipment damage caused by the pocket gopher mounds. Driving equipment or irrigation wheel lines over mounds which may contain several cubic feet of soil can result in equipment damage and increased wear. The most significant damage occurs during hay harvest when cutter bars plow through mounds hidden by the surrounding alfalfa. This leads to dulling and breakdown of the harvest equipment, increasing harvest cost and time and decreasing harvest efficiency.

The presence of the mounds covering the forage crop also reduces forage production. In moderate to dense gopher populations 10 - 20 percent of the soil surface may be covered with gopher mounds. Mound soil often becomes incorporated with the alfalfa during harvest and this has been cited as increasing tooth wear of livestock eating the soil contaminated forage. The disturbed soil also provides sites for undesirable, weedy plants to become established.

Other damage from pocket gopher digging include irrigation ditch washouts, losses of irrigation water, damage to home yards and gardens, orchards, shelter belts, recreation areas, buried pipes and cables, and reforestation projects.

CONTROL METHODS

Several control methods and strategies are available to suppress pocket gopher populations. Integration of several methods is a desirable approach for any pest problem. With pest rodents, the choices are often dictated by the size of the area since many techniques are not practical on large acreages.

Cultural and biological controls controls are part of an integrated approach but in themselves may not reduce damage below economic levels. In crops where flood irrigation is used, pocket gophers and other burrowing rodents are discouraged from becoming established in the crop by the periodic flooding. Crop edges may receive damage from gophers residing in drier crop borders. Conversion in recent years to sprinkler irrigation has resulted in increased pocket gopher damage to formerly flood irrigated crops.

Frequent soil tillage or cropping practices in which the ground is free of vegetation for much of the year discourage occupation by gophers. Crop edges bordering undisturbed ground may receive damage.

In pastures or rangelands managed primarily for the production of grass forage, application of broadleaf herbicides can reduce pocket gopher population by reducing their preferred food source.

Despite gophers' subterranean habits, they are frequent prey for several predators. Coyote and fox, weasels and owls can be significant predators on gophers. Badgers, snakes and hawks also make gophers part of their diet. As with most predator-prey relationships, predators seem to have only a cropping effect on the prey populations. Although the presence of predators should be encouraged, predators alone will seldom depress gopher populations below levels where gopher caused damage is considered insignificant.

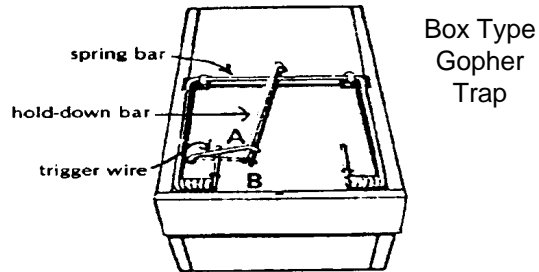
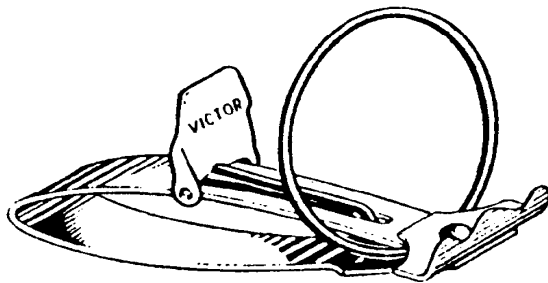
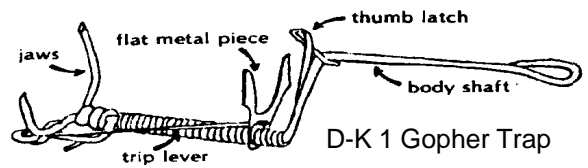
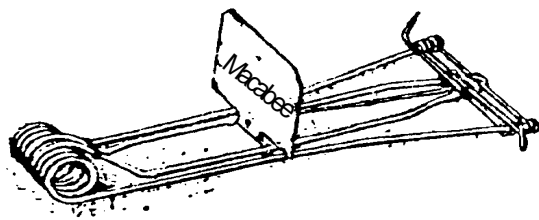


Figure 1. Pocket Gopher Traps.

Trapping is an effective and dependable control method, but is practical only on small to moderate sized areas or sparse gopher populations. It is also a good clean-up tool for removing the remaining animals after control with poison baits. Trapping is slow and expensive in terms of time, labor and materials, but it is a selective technique.

Various kinds of gopher traps are available (Figure 1) and generally one or more are carried by hardware or farm supply stores. Although they vary in design and method of placement, they are all effective. Success in their use depends on the experience and knowledge of the user and the care taken in making a proper set.

The Macabee type trap (Figure 1 & 2) is one of the more available traps in Montana. These traps are set in main tunnels near fresh mound activity (Figure 3). Tunnels are easily located by following the lateral under the mound back to the main tunnel or by probing near the mound with a sharpened rod. Two traps are set 12 - 18 inches into the main runway, one each direction. The burrow may require enlargement with a hand trowel to get the traps in the burrow. The traps are tied to a locating stake and the hole covered to exclude most or all light. Capture in most cases occurs within 24 hours. Since there is usually only one pocket gopher per burrow system, traps should be set at new locations after a gopher is trapped. An exception is when a young,

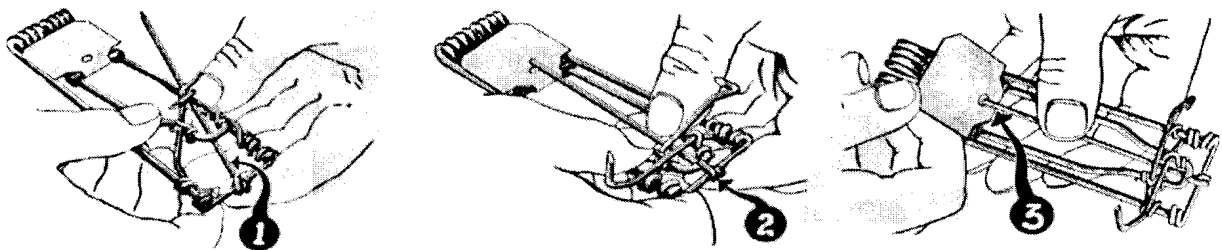


Figure 2. Setting a Macabee Type Pocket Gopher Trap. Place the trigger rod (1) underneath trap as shown. Push down on trap jaws and hook the end to the trigger rod (2) over the end of the trap frame. While holding the frame down place the other end of the trigger rod into the hole of the trigger plate (3).

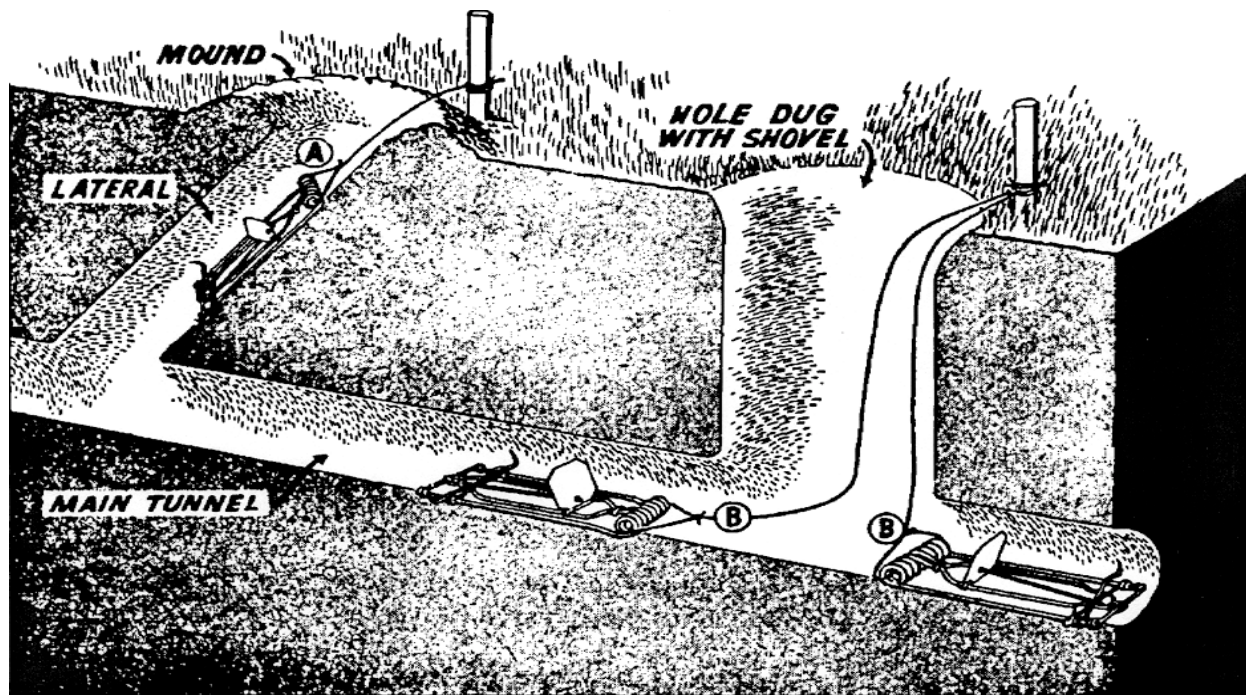


Figure 3. Two methods of Placing Pocket Gopher Traps. A. Single trap set in lateral tunnel. B. Two traps set in opposite directions in main tunnel. Secure each trap to a stake tall enough to be easily seen.

juvenile pocket gopher is caught. Other young gophers may be in the same burrow systems.

Burrow fumigants such as gas cartridges and aluminum phosphide tablets are registered for gopher control. Because of the complexity of gopher burrows, fumigant gases disperse through the burrow system poorly. Since the majority of the burrow system is shallow, much of the gas escapes to the surface, particularly when the soil is dry and porous. Gophers frequently plug off portions of their system during normal burrowing activities or when there is a disturbance which may prevent dispersal of the fumigant gases. For these reasons fumigants are not generally effective and not usually recommended for gopher control.

Poison baits are frequently used for pocket gopher control. The most economical and widely available are grains such as oats or milo treated with strychnine. Strychnine baits are effective providing they are applied properly and are well accepted by the gophers.

Hand baiting and mechanical baiting with a burrow builder are two techniques used to apply poison baits. There are three hand baiting methods for applying

baits: **1.)** The open hole technique in which bait is placed in the main tunnel by carefully removing a burrow plug and placing the bait in the tunnel with a long handled dipper or spoon. Disturb the burrow system as little as possible. Replug the burrow after bait placement taking care not to cover the bait. **2.)** The probe method where the bait is placed in the burrow through a probe hole (Figure 4); and **3.)** A bait dispenser technique in which a hand operated mechanical probe with a bait reservoir is used to probe and dispense bait in one operation. In all three methods each gopher burrow system should be baited at 2 or 3 locations near freshly dug mounds.

Mechanical burrow builders are tractor drawn devices that form an artificial burrow and deposit poison bait into the burrow in a single operation (Figure 5). The burrow builder consists of a knife-like shank and torpedo assembly which makes the artificial burrow, a coulter wheel which cuts through surface trash and roots ahead of the shank and a packer wheel(s) which closes the furrow behind the shank. The torpedo that forms the burrows is set at a depth (6-12 inches) to intersect the gophers' natural burrows. Gophers quickly investigate the new burrow in their system and in the process find and eat the

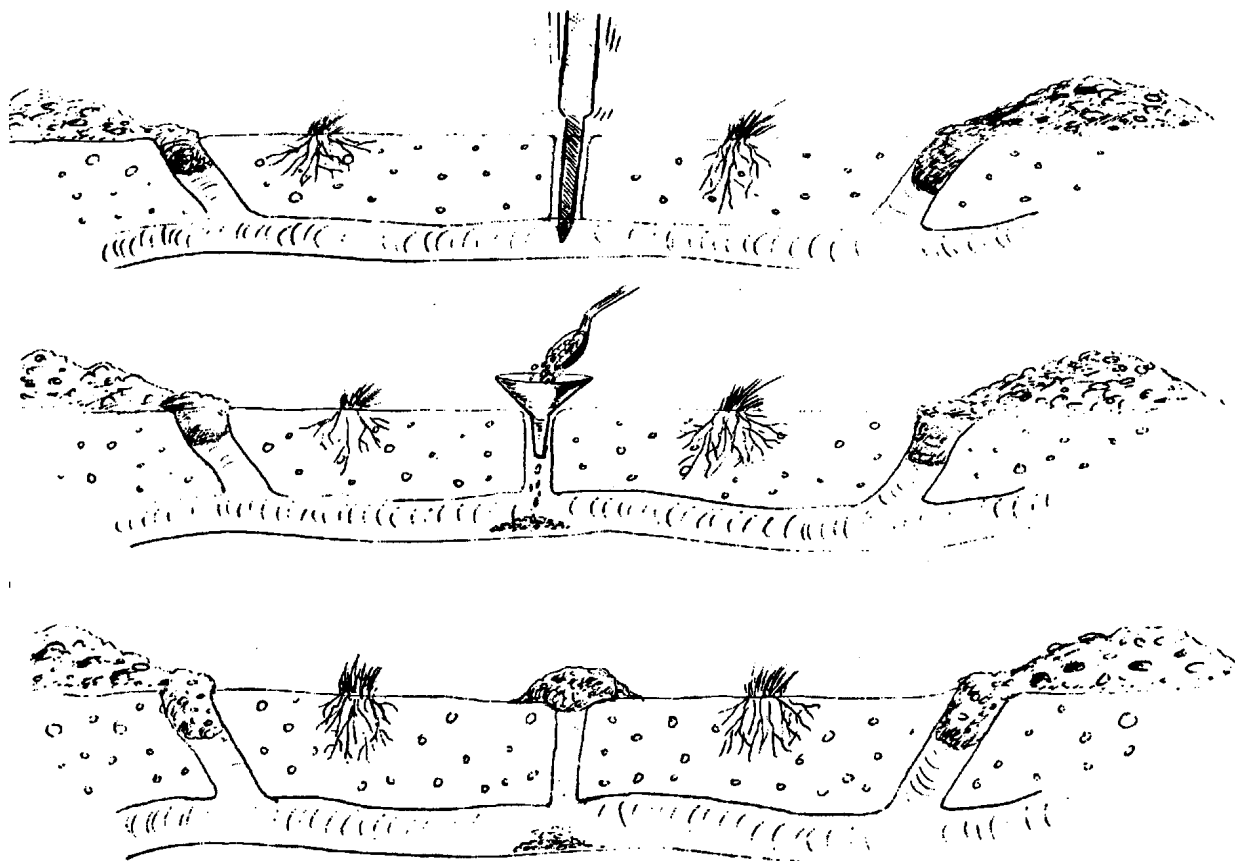


Figure 4. Hand Baiting Pocket Gophers. Top: Use probe to locate main burrow. Twist probe to enlarge hole. Center: Place funnel in Probe hole. Pour measured amount of grain into hole. Bottom: Place clod or sod over hole to seal opening. Do not allow loose soil to cover bait.

poison bait. Burrows should be spaced at 20 to 30 foot intervals depending on gopher density. Only those sections of a field with pocket gophers need to be baited.

When the burrowbuilder is used in good soil and with good bait acceptance, a high degree of control can be expected. In many cases poor control is the result of improper application. The burrow builder is limited to soil type and moisture conditions where clean runways are formed. Caving of the tunnel will cover the bait, resulting in poor control. Dry, sandy or rocky soils, or soils with numerous tree roots, do not form adequate burrows. In addition, higher than normal wear and damage to the burrow builder can be expected in these soils. When the burrow builder is used in soil that is too wet, soil may cling to the packer wheel causing the burrow to remain open.

When beginning application and periodically during treatment the burrow should be checked to assure a good burrow is being formed. Inspect the bait tube occasionally. It sometimes becomes plugged with soil.

Field studies in Montana indicate that the strychnine baits available in Montana are sometimes not well accepted by pocket gophers. The reason for this is not presently understood. To obtain the best results with the products available, careful application technique and timing of the application are important.

Gopher control by any method is most effective when gophers are active near the surface. This is indicated by frequent mound building activity and usually occurs in spring and fall when moisture is

high. Activity declines in summer as surface moisture dries and soil temperatures rise. Under irrigated situations, gophers may remain active near the surface the entire summer.

Hazard to nontarget animals when using poison baits for pocket gopher control is usually quite low. Since the bait is applied underground in gopher burrows, it is available to few other animals except the gophers. Any bait spilled on the surface should be buried immediately to avoid poisoning of seed-eating birds and livestock. Intentional surface baiting for pocket gophers is ineffective and not a recommended practice.

Before using any rodenticide or any other pesticide products carefully read and understand the pesticide label. When not in use, store pesticides in locked storage. Always keep pesticides in the origi-

nal, labeled container.

For additional information on pocket gopher control or other pest rodents, program presentations, field rodent control demonstrations or information on other vertebrate pest problems, contact:

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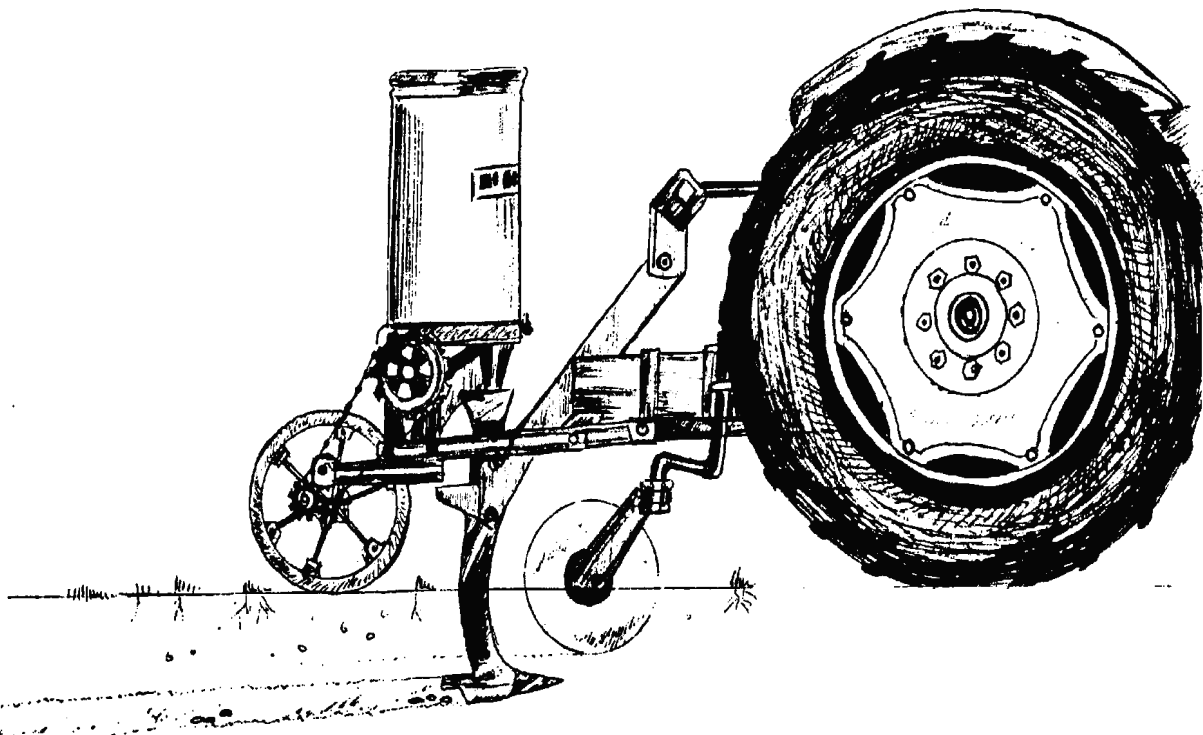


Figure 5. A Pocket Gopher Burrow Builder. The burrow builder meters out grain into an artificial burrow. Pocket gophers enter the artificial burrow where it intersects the natural burrow and find the bait.

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